

NEWS REPORT

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Building Research in the Atomic Age

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THE recent research correlation conference on "Laboratory Design for Handling Radioactive Materials," conducted by the Building Research Advisory Board, was a gratifying example of the type of interdisciplinary conference which is frequently sponsored by the National Academy of Sciences-National Research Council. For some years knowledge on this subject has been restricted to members of the Atomic Energy Commission and its staff scientists, architects and engineers specially concerned with construction at the various Commission installations, and architects and engineers in private practice formerly or presently under contract with the Commission. The need for disseminating the results of research among architects and engineers and others in the building industry had been expressed on frequent occasions. The conference provided an opportunity to correlate the information hitherto restricted to those working with the Commission and to accomplish an interchange of information beneficial to all, including those who had had experience with only one or two of the Atomic Energy Commission projects.

The subject of the conference is one which has been largely "under wraps," since many items, though not themselves confidential in nature, were recorded in classified documents containing other infor-

mation vital to national security. A special committee of the American Institute of Architects, experienced in Atomic Energy Commission work, together with two Institute staff members, has conferred with the Commission over a period of almost three years in the hope of promoting a declassification process which would open up the whole field of design and construction of atomic energy laboratories to architects, engineers, and industrial people generally. The Institute committee had been permitted to inspect all but the most highly restricted areas of several Commission installations and had been able to publish some general planning data.

The conference herein reported, co-sponsored by the Commission and the Institute, was the culmination of these activities and should be the forerunner of other more specialized conferences in the same field. The interest manifested and the range and variety of problems and solutions proposed, plus the rapid increase in the non-military use of radioactive materials as revealed at the conference, underscored and amply substantiated the sponsors' emphasis on its significance.

The use of radioactive isotopes for research, experimentation, testing, or therapy in agriculture, medicine, and industry has by now somewhat outrun the facilities for such activities. Within a few years, the

number of laboratories purchasing isotopes from Oak Ridge has increased from zero to approximately 1,500 and is growing rapidly.

While the military and defense aspects of atomic energy have naturally been much publicized and discussed, the vast and exciting field of non-military applications in science, architecture, and engineering so far has not caught the fancy of the general public. It seems probable that in the near future all colleges and universities will require laboratories in which radioactive materials can be safely used. Some laboratory and science buildings now in the planning or construction stage may be obsolete before problems such as laboratory layout, air supply and exhaust, control and shielding, surfaces and finishes, and waste disposal are solved. These vital considerations were among the problems emphasized during the conference.

Much of the research reported may properly be called "project research," since it was composite, involving two or more sciences and technologies. It could also be called "development research" since it was carried on by teams of varied personnel at full operating scale, even though the end product—nuclear science research or production—might be pure theory or a pilot plant.

Many who are concerned with laboratory planning and equipment are inclined not to attach sufficient importance to general planning considerations such as circulation, access, traffic control, etc. and tend to think of solutions in terms of instrumentation and more complicated equipment. For example, if the serious problem of air turbulence in and near hoods is due mostly to rapid motion of passers-by, the solution may be found in planned study of hood location relative to traffic and location of doors, rather than in increased exhaust airflow or elaboration of design of the hood face.

While elimination or control of health hazards for human operatives is, of course, of major importance, it was emphasized that in some types of research the more difficult problems are those of technical contamination, which is serious at levels of radioactivity far below those constituting

health hazards. Valuable research work, involving measurement of quantities one-millionth of those measurable with the best balances and microscopes, may be ruined by radioactivity in the environment, equipment, clothing, and room surfaces.

The conference disclosed two schools of thought in regard to shielding, control, and disposal, with strong partisans in both camps among the Atomic Energy Commission personnel. They are unofficially called the "CCC" (concentrate, confine, and control) and the "DDD" (dilute, disperse, and decontaminate). To a non-partisan architect, it appears that the choice is a matter of scale, dictated to a certain extent by the nature of the activity to be carried on. The "CCC" group, which advocates dry-boxes or glove boxes, claims great simplicity and economy in operation and in monitoring, laundering, etc. and notes that these techniques can be used for operations involving human subjects and large experimental animals. The "DDD" proponents claim greater freedom with the laboratory, which is regarded simply as a larger dry-box, with the most toxic material handled under hoods, which are non-portable variants of the dry-box. The two approaches, however, do not differ essentially with regard to problems of disposal beyond the walls of the laboratory.

The assumption that non-Commission laboratories to be designed by non-Commission architects will deal mostly with isotopes of low activity is too readily and casually accepted. Architects must be prepared for an accelerated increase in the use of materials of higher activity levels. They will have to familiarize themselves with the tolerances and variable hazards, the different effects of alpha, beta, and gamma rays at various intensities of each, so that they may discuss intelligently with their clients the various types of operations and possible future rearrangement of facilities. In general, this knowledge will assist the architect in the perennial problem of securing a definite program from his client and will expedite agreement among collective clients.

It is reasonable to predict that in the near future the number of sciences and technologies, the number of types of build-

ings, and the number of buildings affected by nuclear science and by the levels of radioactivity to be dealt with in non-Commission laboratories and industries will advance in geometrical progression. All of the applied sciences and related industries and professional training methods will be revolutionized, and it appears that a great deal of new construction and remodelling work in educational institutions and laboratories of all kinds will require early dissemination of design data and criteria.

The following statement made by Nelson Garden of the Berkeley National Laboratory, one of the conference speakers, is a jump or two beyond laboratories for research and education, but a logical extension of the forward-looking temper of the conference.

Whether or not some of us like it, we are at the beginning of an atomic era. Its growth is going to be more fantastic than the wildest dreamer dares to picture.

On the basis of that statement, I feel brave enough to suggest that the day will come when a small parcel of nuclear energy may be delivered to a home or building, once a year, and it would provide all necessary heat, cooking, air conditioning, light, etc. This should have a very great impact on architecture.

Not long ago such a prophecy was deplored by scientists and regarded as Sunday Supplement or Buck Rogers stuff. But here was a serious scientist, addressing a conference attended by approximately 300 highly competent scientists, architects, engineers, and manufacturers, all seriously considering how to plan facilities to handle these very possibilities rapidly becoming facts.

Research on National Disasters

WILLIAM N. FENTON

Executive Secretary, Division of Anthropology and Psychology

WHAT will the people do in any given American city if a major disaster follows enemy action? We know more about the potential magnitude of the various kinds of disasters which an enemy might inflict than we know about the behavior of American people under stress. We do not know whether the history of the British, German, and Japanese reactions to disaster apply to us or not. How, then, can we predict with any degree of certainty what the population of a given city will do since no one has studied the behavior of our citizens when struck by a disaster of similar magnitude?

The question whether our ignorance in this respect constitutes a serious threat to national security was brought home to scientists last May when the Department of Defense asked the National Academy of Sciences-National Research Council to mobilize the resources of American science in order to consider the problem and suggest ways and means of dispelling such ignorance. The psychological and anthropological factors in the situation loomed large in the minds of the physicians who

formulated the request, and their attention was gradually focused on the question of whether or not the coordination of the complicated human factors involved in the study of national disasters falls within the province of the Academy-Council.

Not only the Department of Defense but also agencies outside the Government were aware of the problem and of the need for studying it. At the same time that the Defense Department was formulating its request and asking the Academy-Council to deal with the scientific problems involved in disaster study, the scientists working in establishments connected with the Department of Defense began contracting with independent research groups in universities. As a consequence, several disaster study programs are being conducted outside of government agencies and are operating independently of one another. These overlap inevitably, and certain facets of the problem are being neglected. The need for coordination of these activities in a central office and for a responsible person to head up the program are paramount concerns.

To date, the Academy-Council has performed the role of intermediary by bringing together officials of the Department of Defense and American scientists, some of whom are conducting disaster research projects. The Council has utilized its facilities and staff to organize and conduct a Conference on Disaster Studies which met on neutral ground at the National Academy of Sciences on December 6, 1951.

History will usually provide a precedent for a course of action. In opening the conference, S. S. Stevens, Chairman of the Division of Anthropology and Psychology, noted that the Academy had been concerned with a disaster study in the second year of its existence. In 1864, a committee was appointed to investigate the explosion of the U.S.S. *Chenango* in which most of the crew were killed when the boiler burst. As in the present instance, other commissions working on the problem disagreed on the cause of the explosion. With the press clamoring for a solution, the Navy submitted the case to the Academy.

Because the present problem is far more complicated and the threat of far greater magnitude, the Federal Civil Defense Administration is alerting the public to the danger and giving instruction in preparedness measures. Science, however, is better prepared than formerly to meet the danger, for the following reasons: 1) individual scientists have made studies of minor disasters; 2) other scientists have confronted projects of comparable magnitude and complexity; 3) the behavioral sciences have made strides in recent years in the study of stress, morale, rumor, panic, social structure, and social control.

The scientific problems emerging from the preliminary discussion of disaster studies are many and varied, but in common they cut across several disciplines. The atomic scientist, having established that the effects of nuclear radiation are negligible after the first 15 minutes following the blast, encounters a training problem in teaching people how to live with radioactivity. The learning process is impeded by certain folk beliefs which began merely as rumors. For example, beliefs persist that radioactivity hangs around after an atomic

blast, that running away from the scene of disaster is necessary, that nothing can be done about the situation beforehand, and, among suburbanites, that the city people will move in on them. To offset these folk beliefs the psychological value of keeping busy must be emphasized. The Federal Civil Defense Administration is training people to work constructively in the hope of cutting down fatalities as much as 50 percent. The problems of medical logistics—providing adequate quantities of dressings, plasma, beds, doctors, nurses, ambulances—are paralleled by problems in sanitation, communication, and transportation.

Even more complex are the problems of social disorganization and social control. Psychological studies of emotional stress under impact of air war hold some promise for predicting behavior in disasters of greater magnitude, but the psychologists present at the Disaster Conference cautioned against extrapolating data from small disasters to apply to larger ones. Teams are at work testing the findings from the study of minor disasters which occur with alarming regularity in our society. The history of the reaction to these disasters shows the regional and class differences in reaction patterns. The experience gained in making such studies suggests the need for further studies in breadth and depth.

What are the lines of authority and how can study teams be authorized to proceed in a disaster area? Difficulties have arisen in getting approval for teams to establish rapport with local officials and with victims, especially when the victims and interviewers represent distinct regional variants or different levels in society. The advice of a political scientist familiar with jurisdictional problems of relating science to government at the local, state, regional, and national levels will be needed.

Coordinating the work of research teams looms as one of the greatest potential contributions of a National Research Council committee. Present research methods and field techniques call for constant evaluation and revision to fit new needs. The specialists of one discipline stand to gain by learning the methods and techniques of colleagues from other fields.

Problems in human organization intersect disaster study at all levels. Disasters befall not populations, but people, and these people are organized into societies with cultural traditions that differ locally, regionally, and strata-wise in our larger cities. We must find out whether or not past behavior patterns under stress have predictive value. Civil defense workers are people; they are organized along definite lines upon the basis of certain assumptions about the nature of American society which imply certain expectations of behavior under stress. Studying the organization and experience of rescue groups may be a concern of the proposed committee.

The proposal of the Department of Defense would appear to call for the establishment by the National Research Council of a central administrative office for the collection and dissemination of information on disaster study. It also implies the need for the establishment of an advisory committee which would focus attention on scientific problems in the behavioral sciences. Such a committee, composed of representatives from scientific societies affiliated with the Research Council and representatives of government agencies, would analyze reports from the field, draw conclusions from the reports, redirect work along new lines of inquiry, and make recommendations for action. The proposal further envisages the need for a supervisory office to contact the teams in the field and to perform clearing-house functions. The possibility of coordinated direction under such a set-up would enable other agencies to participate later. The plan calls for some twenty field groups in order to secure adequate coverage for the country.

Some permanent gains for science will accrue from such a plan. It will provide a mechanism for studying domestic disasters of lesser magnitude which occur regularly. It will serve to train personnel capable of making observational studies soon enough to recognize the pattern of trauma in disasters, and the individual observers will learn the advantages and limitations of working in teams. Since these teams will be drawn from many scientific fields, appreciation of the work of related disciplines will be built into the "habit systems" of

research workers. A major job for the proposed committee will be to bring about the necessary liaison between the disciplines and to ensure that a multidisciplinary approach is carried into the field and is employed in the analysis and evaluation of the reports. An important advantage inheres in making effective alliances between a professional staff in survey centers and teams of independent and partly volunteer investigators who are locally available and able and willing to make such studies. The chances are that problems arising from regionalism and local prejudice can thus be obviated. Possibly such a coordinated study will enable us to advise the engineers charged with planning transportation and communication what people are likely to do if a major disaster occurs.

The Conference on Disaster Studies concluded its session by recommending 1) the approval in principle of the proposal of the Department of Defense and 2) the appointment of a continuing Committee on Disaster Studies by the National Research Council. This committee, it was believed, should conduct a survey in the fields of scientific research and development applicable to problems which might result from disasters caused by enemy action. Such a Research Council committee would be charged with the responsibility of coordinating the functions of various projects, both those already in existence and those still in the planning stage, of proposing additional fields of study, and of taking an active part in the collection and dissemination of scientific and technical information about disasters. The Chairman agreed to report the findings of the conference to the Governing Board of the Academy-Council and to seek decisions on policy matters.

At this writing, a contract in support of the disaster study program has been negotiated with the Department of Defense. In anticipation of the establishment of a permanent Committee on Disaster Studies, the staff of the Division of Anthropology and Psychology is assembling a "Who's Who in Disaster Studies" which will include reference to existing projects, and is establishing informal liaison with the agencies which participated in the conference and with other independent study groups.

Original Signature Book

National Academy of Sciences

ROBERT B. LIVINGSTON

Assistant to the President of the Academy

LAST spring the original signature book of the National Academy of Sciences was discovered among some inactive files in the basement of the Academy building. The search for this document was initiated as a result of a suggestion by President Bronk that it would be desirable to have a signature book of all the living members of the Academy. Edwin B. Wilson remembered having read in the Academy minutes that a committee had been appointed to prepare such a book at one of the first meetings. Dr. Wilson felt that the original signature book might be found and that this document would establish the proper point of departure for a modern members' book.

The original book, 6½ by 8 inches, and bound in black leather with gilt-edged pages, is in rather shabby condition today because of water stains and the ravages of silverfish, but the seven pages written upon bear the clear autographs of many of the incorporators and early members of the Academy. At the President's suggestion, these pages have been reproduced by colotype gravure and have been printed upon sheets of fine paper for binding into a new signature book for the Academy.

Upon seeing the original book, my interest was aroused as to when the book was initiated and who might have taken an active part in its preparation. Some evidence is available from the book itself, but the first reference to it is to be found in the minutes of the third and last day of the organizational meeting of the Academy, April 24, 1863. On that occasion, it was voted, upon a motion of Wolcott Gibbs, "that a committee of two be appointed to arrange a book for the signatures of the

members. Mr. Gibbs and Mr. W. B. Rogers were appointed said committee."

This committee did not make any report; but, since a book came into being, we may suppose that Mr. Gibbs and Mr. Rogers were responsible. However, the handwriting on what might be called the title page, "Autographs of Members of the National Academy of Sciences," and the handwritten caption on the first page of signatures, "We, the undersigned, accept the membership of the National Academy of Sciences, & agree to be governed by its laws," are obviously written by two different persons and, in neither case, does the writing appear to be that of Wolcott Gibbs. Since W. B. Rogers neglected to sign the book himself, his own participation in this activity might be questioned. As nearly as I have been able to determine, the writing on the title page corresponds closely with the signature of H. A. Newton, and the writing above the first signatures with that of Benjamin A. Gould, but this is mere conjecture.

It is interesting to note that the incorporators signed in alphabetical order and that spaces were left for the following names: William H. C. Bartlett, who never signed the book although he lived until 1893; V. A. Boyden, whose refusal to join the Academy is recorded in the minutes of January 8, 1864; John A. B. Dahlgren, whose resignation was accepted and recorded at the same meeting; George Englemann, who, like Bartlett, never signed, although he did not die until 21 years after incorporation of the Academy; Joseph Leidy, who died in 1891; Meirs F. Longstreth, who resigned in January, 1867, without signing; Robert E. Rogers, who signed

along with members elected 12 years after the founding of the Academy and not with the incorporators; and W. B. Rogers, who, as indicated above, did not sign. The signature of William D. Whitney, who was not elected until August 5, 1865, also appears among the incorporators. Spencer F. Baird signed the book twice, once in error among the incorporators and again among the members elected in 1864 who took the oath of fealty on January 3, 1865.

Lines have been drawn through the spaces left for the signatures of two of the incorporators of the Academy: Joseph H. Hubbard, who died August 16, 1863, and Edward Hitchcock, who died February 27, 1864. It seems probable that no one would have done this before their death or at least until after it was certain that they would be unable to sign the book. One is tempted to suppose, then, that the book was started some time after February, 1864.

On the page following the signatures of the incorporators we find the quavery signature of Benjamin Silliman, Sr., who died November 24, 1864. This would seem to establish the origin of the book some time between February and November, 1864.

However, the book also contains the signature of J. G. Totten, who died April 22, 1864. Clearly then, the signature book must have come into being and been circulated among the Academy membership some time during the year following incorporation. In view of the transportation difficulties at that time, it is most probable that the original signature book of the National Academy of Sciences was initiated at the first official meeting of the Academy January 4-12, 1864. This is consistent with the fact that both the senior Silliman and J. G. Totten, whose signatures appear, were present at these meetings held at New Haven.

The original signature book of the Academy was continued for a period of 14 years and then allowed to lapse. During this time, however, signatures of some of the most distinguished scientists in American history were appropriately inscribed. It is fortunate that this little book, which is such an important document in the history of the Academy, has been brought to light. Facsimiles of the original pages will be published as a memorabile of the Academy and will be distributed to the members.

SCIENCE NEWS

GRANTS IN CANCER RESEARCH

The five sections of the Committee on Growth (Biochemistry, Biology, Biophysics, Chemotherapy, and Clinical Investigations), composed of fifteen panels or sub-sections, met on December 15 and 16 in Washington to consider applications for grants in cancer research to be awarded by the American Cancer Society.

The fifteen panels, composed of 96 investigators drawn from institutions all over the country, represent areas in the basic and clinical sciences pertinent to cancer research. By having the groups meet concurrently, advice from each panel is freely available to all other panels, thus permitting adequate evaluation of applications involving a combination of scientific disciplines.

In this way, it is usually possible to obtain information based on personal knowledge regarding each applicant and his institution. The best projects can be selected more readily when all requests are considered at one meeting.

A total of 339 applications requesting \$2,865,831 were considered at the two-day meeting. Although final action has not yet been taken, it appears that it will not be possible to approve more than 75 percent of the applications, or 60 percent of the total funds requested. Applications which are received favorably will be recommended to the American Cancer Society. Applicants whose requests are declined will be notified directly by the Executive Secretary of the Committee on Growth.

NOBEL PRIZE IN CHEMISTRY

Edwin M. McMillan and Glenn T. Seaborg, both of the University of California at Berkeley and members of the National Academy of Sciences, were awarded the 1951 Nobel Prize for Chemistry in a ceremony in the Stockholm Concert Hall, December 10, 1951. In his presentation address, Arne Westgren, Chairman of the Nobel Committee for Chemistry, gave a brief account of Dr. McMillan's and Dr. Seaborg's discoveries in the realm of the chemistry of the transuranium elements which had earned for them the Nobel Prize.

NUCLEAR GLOSSARY

The following three sections of the *Glossary of Terms in Nuclear Science and Technology* have been published: Section IV, Chemistry; Section VIII, Isotopes Separation; and Section IX, Metallurgy. Section I, General Terms, and Section II, Reactor Theory, the two remaining sections of the *Glossary*, are nearing completion.

The preparation of this *Glossary* in its present sectional form was authorized by the National Research Council Glossary Conference which consisted of representatives from scientific and technical societies and organizations including government agencies. The work has been carried out by committees and individuals operating under the direction and sponsorship of the National Research Council with financial assistance from the joint program of the Office of Naval Research and the Atomic Energy Commission and in collaboration with the American Society of Mechanical Engineers. This Society has assumed responsibility for publishing the various sections. Distribution is being made from the Society's office, 29 West 39th Street, New York City 18.

COMMITTEE ON ASTRONOMY

The Committee on Astronomy Advisory to the Office of Naval Research met in Washington, January 19 and 20. Fifty-three applications for support of research in the field of astronomy were reviewed, and recommendations were drafted for forwarding to the Office of Naval Research.

TABLES OF CONSTANTS AND NUMERICAL DATA

At the annual meeting of the Division of Chemistry and Chemical Technology, December 1, 1951, E. R. Smith, Secretary of the Committee on Tables of Constants and Numerical Data, reported on that phase of the work of the Committee which is sponsored by the National Bureau of Standards at Princeton University. Dr. Smith indicated that the Bureau would continue its financial support of the program. Alfred Weissler, who was invited to attend the meeting as a representative of the Office of the Chief of Ordnance, Department of the Army, reported that negotiations are still in progress regarding the possibility of support from that Office. He stated that the Office of Ordnance Research was particularly interested in two phases of the program, namely, kinetics of polymerization and kinetics of oxidation and combustion reactions.

COMMITTEE ON GEOPHYSICS

The following scientists have been appointed to serve on the Committee on Geophysics Advisory to the Office of Naval Research: Arthur F. Buddington, Princeton University; Darrell S. Hughes, University of Texas; and Konrad B. Krauskopf, Stanford University. The Committee met in Detroit last November to consider and report on research proposals referred to it by the Geophysics Branch of the Office of Naval Research. The Committee will hold its next meeting in Washington early in May.

RADIOCHEMISTRY

The Subcommittee on Radiochemistry of the Division of Physical Sciences has been reconstituted with the following membership: Charles D. Coryell, Massachusetts Institute of Technology, *Chairman*; Milton Burton, University of Notre Dame; Robert B. Duffield, University of Illinois; Spofford G. English, Atomic Energy Commission; Morris L. Perlman, Brookhaven National Laboratory; David H. Templeton, University of California at Berkeley; and Anthony L. Turkevich, University of Chicago.

PROPOSED AGRICULTURAL RESEARCH INSTITUTE

On December 10, 1951, a conference of approximately 100 representatives of agricultural industries, government agencies, research institutions, and farm organizations was held at the Academy-Council to consider a proposal of leading industrial scientists to organize an Agricultural Research Institute. The objective of the Institute would be to further the kinds of agricultural research and practices needed to insure the best long-term utilization of the nation's agricultural resources.

The conference members endorsed the proposal and agreed to work toward the early establishment of the Institute. It was further agreed that the Institute should be set up under the auspices of the Academy-Council and that the pattern of organization should follow that adopted by the Industrial Research and Building Research Institutes. The Chairman of the National Research Council was requested to appoint an organizing committee to draft bylaws and fiscal procedures acceptable to the Academy-Council. When this step has been completed and sufficient membership in the Institute has been assured, a second conference will be called and the bylaws presented for adoption.

Membership in the Institute would be open to companies which process or sell agricultural products and those which manufacture materials or machinery used in agriculture, to farm and trade organizations, and to institutions and experiment stations which conduct research beneficial to agriculture.

Some of the industrial representatives present at the conference committed their companies to immediate participation in the expenses pursuant to organizing the Institute and a majority voted to recommend participation to their management.

HIGHWAY RESEARCH BOARD

Over 800 of the nation's top highway engineers attended the thirty-first annual meeting of the Highway Research Board of the National Research Council, held in Washington, January 14-18. The meeting

included 29 separate sessions at which over 150 technical papers and reports were given. The discussions covered highway research in design, administration, traffic, maintenance, and related phases of highway planning and construction. Fifty-five of the Board's regular departments and committees also held business meetings during the week.

Geoffrey Grime, of the Road Research Laboratory, London, England, gave the opening address of the first general session. He spoke on traffic and road safety research. Fred Burggraf, Director of the Highway Research Board, led a discussion on the recent road test conducted near La Plata, Md., at the same session.

ACADEMY-COUNCIL LECTURE

William Shockley of the Bell Telephone Laboratories delivered the fourth address in the Academy-Council lecture series, Tuesday afternoon, December 18, 1951. Dr. Shockley spoke on "Transistor Physics" and the progress made in this field of research with particular regard to the development of the junction transistor. He illustrated the electrical behavior of transistor units under varying conditions of operation by diagrams traced out on an oscilloscope screen.

MATHEMATICIANS PLAN CONFERENCES

A Committee on Scientific Conferences has been established by the Division of Mathematics of the National Research Council. E. J. McShane, professor of mathematics, University of Virginia, has been appointed Chairman. Other members of the Committee are: L. V. Ahlfors, Harvard University; H. F. Bohnenblust, California Institute of Technology; Saunders MacLane, Princeton University; and P. A. Smith, Columbia University.

It is hoped that a small number of conferences can be arranged each year following the pattern of conferences recently sponsored by the National Academy of Sciences in such fields as low temperature physics, immunochemistry, and quantum mechanics.

MINERALS AND METALS RESEARCH IN THE DEFENSE EFFORT

A new Minerals and Metals Advisory Board, which will serve as a research advisory group to the Department of Defense and to civilian governmental agencies responsible for research and development in mineral technology and metallurgy for the defense effort, has been organized under the National Academy of Sciences-National Research Council. The Board was formed by reconstitution of the Metallurgical Advisory Board, which was established about a year ago to advise the Chairman of the Research and Development Board on problems of metallurgical research in the Department of Defense. The new Board will take over this advisory function and will assume the added responsibility of advising civilian defense agencies through the Director of the Bureau of Mines.

The scope of the new Board's interests is expected to include the appraisal of technical problems involved in: 1) production and use of metallic and non-metallic minerals; 2) treatment of low-grade minerals and ores and other minerals and ores not commonly processed; 3) production of raw materials and intermediates, and the use of substitutes for them; and 4) new or different processes for production of non-metallic minerals, and metals and metal end products.

Francis C. Frary, recently retired Director of Research of the Aluminum Company of America, will be Chairman of the new Board. Zay Jeffries, General Electric Company, and Robert F. Mehl, Carnegie Institute of Technology, will serve as Vice-Chairmen. Other members of the Board are: E. C. Bain, United States Steel; A. L. Boegehold, General Motors Research Laboratories; John Chipman, Massachusetts Institute of Technology; C. H. Herty, Jr., Bethlehem Steel Company; A. J. Herzig, Climax Molybdenum Research Laboratories; M. A. Hunter, Rensselaer Polytechnic Institute; W. E. Jominy, Chrysler Corporation; A. B. Kinzel, Union Carbide and Carbon Research Laboratories; C. K. Leith, Washington, D. C.; D. H. McLaughlin, Homestake Mining Company; Paul D. Merica, International Nickel Company of

Canada, Ltd.; A. J. Phillips, American Smelting and Refining Company; O. C. Ralston, U. S. Bureau of Mines; Leo F. Reinartz, Armco Steel Corporation; C. S. Smith, University of Chicago; E. C. Smith, Republic Steel Corporation; J. G. Thompson, National Bureau of Standards; K. R. Van Horn, Aluminum Company of America; and Clyde Williams, Battelle Memorial Institute.

The staff which has been serving the Metallurgical Advisory Board will continue with the new Board. This group includes Verne H. Schnee, Executive Director; William J. Harris, Jr., Executive Secretary; five staff metallurgists; and nine Board consultants.

APPOINTMENT TO ORDNANCE RESEARCH COMMITTEE

Einar Hille, professor of mathematics at Yale University, has accepted membership on the Committee on Basic Research which advises the Office of Ordnance Research on the merits of proposals received in connection with its basic research program.

AIR FORCE LIAISON REPRESENTATIVE APPOINTED

Colonel Oliver G. Haywood, Jr., Chief of Scientific Research at Headquarters, Air Research and Development Command, Baltimore, has been appointed Liaison Representative of the Department of the Air Force in the Division of Mathematics. The Office of Scientific Research was organized recently to support and encourage basic research in fields of science of interest to the Air Force and to further understanding of the value of basic research to the Air Force mission.

Colonel Haywood has had a wide variety of technical assignments including service with the War Plans Division of Air Force Headquarters, the Manhattan Project, the Atomic Energy Commission, and the Los Alamos Scientific Laboratory. He graduated from the U. S. Military Academy in 1936 and the Air War College in 1950. His thesis entitled "Military Doctrine of Decision and the von Neumann Theory of Games" was recently published by the Rand Corporation.

INSECT PHYSIOLOGY

An Ad Hoc Conference on Insect Physiology sponsored by the Division of Medical Sciences was held at the University of Cincinnati, December 8 and 9, 1951. Approximately sixty-five research workers in the fields of entomology, genetics, and ecology attended. In addition to statements by panel chairmen on investigative trends and inadequacies in the three fields, sixteen outline summaries on current research on the physiological aspects of insecticide resistance, and insect genetics and ecology were presented.

The conference recommended that further work be done on insecticide resistance; mode of action of insecticides, attractants, and repellents; detoxification mechanisms; and the general physiology and biochemistry of insects. It was also recommended

that fundamental data be sought on biological and ecological approaches to naturalistic control, including the utilization of parasites and disease organisms.

TYPHOID IMMUNIZATION

An Ad Hoc Committee on Typhoid Immunization has been formed in the Division of Medical Sciences to examine various questions pertaining to the efficiency of present immunization methods. The relative importance of sanitation and immunization in the control of typhoid fever has not been conclusively determined. The disease occurs even in immunized populations where effective systems of sanitation become inefficient. The relation of exposure to degree of immunity attained and continued with different antigens is not adequately known.

SCIENTIFIC MANPOWER

RECENT DEVELOPMENTS IN THE MANPOWER FIELD

The relationship between mobilization policies and goals and the national effect on science and technology continues to be a matter of concern to the Executive Branch of the Government. While the manpower demands of the military services are not likely to be severe for the next few months, the situation for next year still looks rather tight. Attention therefore is being given to more satisfactory procedures for weighing the requirements of the military services against the needs of the nation and to the problem of providing adequate training.

There seems little reason at present to expect any significant change in the policy of student deferment for the next academic year. Attention is being given, however, to strengthening the Selective Service Advisory Committees to permit them to assist in advising on individual cases. The nucleus

of a staff to aid these Committees already has been secured. Irving Whittemore, professor of psychology at Boston University, will serve as Executive Secretary of this staff.

DECLINE IN SCIENCE GRADUATES

A telegraphic survey covering 25 leading universities and 25 four-year colleges has revealed a drop in the number of science graduates at the baccalaureate level. A comparison of the number of students graduating from these institutions in 1950 and in 1951 shows a progressive decline, with the probable number graduating in 1952 approximately two-thirds of that in 1950. The greatest drop appears to be in chemistry, with physics next in the percentage reduction. A more detailed survey covering all institutions will be carried out in the near future.

FELLOWSHIP PROGRAMS

PREVIEW OF FULBRIGHT OPPORTUNITIES

The 1953-54 competition for Fulbright awards for university lecturing and post-doctoral research in East Asia and the Pacific will be announced early in March. Nearly 100 awards are to be made available for the following countries: Australia, New Zealand, Japan, the Philippines, Burma, Thailand, India, and Pakistan. Application forms and detailed programs may be obtained after March 1 from the Conference Board of Associated Research Councils, 2101 Constitution Avenue, Washington 25, D. C.

VISITING FULBRIGHT SCHOLARS

Exchange of university professors between the United States and foreign countries has been encouraged and generously supported under the Fulbright Program. However, the full benefits of the Program have not been realized as yet due in large part to the difficulty of informing all interested persons regarding procedures for obtaining Fulbright aid. The benefits offered to Americans are fairly well known in most academic circles, but the opportunities available to foreign scholars and the procedures for inviting these people to serve as lecturers or guest research scholars in American institutions are rarely understood. For this reason, the editors of *NEWS REPORT* decided to provide their readers with the essential facts.

Fulbright grants are paid in foreign currencies, and those available to foreign scholars cover only the costs of round-trip travel from their respective countries to the United States (or to the final destination within the United States). Therefore, in order for scholars to benefit from the Program, it is necessary for them to secure dollars from other sources to finance their stay, and to present evidence of such dollar resources at the time of making application for an award. The U. S. Government has

made available to a limited number of scholars in most countries participating in the Fulbright Program dollar grants-in-aid under the Smith-Mundt Act which are intended to supplement the Fulbright award. The selection of scholars for Smith-Mundt aid is made by the U. S. Embassy in the scholar's own country. During the current academic year, approximately 151 scholars, in contrast to 71 last year, are receiving such aid to cover their expenses in the United States.

Foreign scholars may secure information regarding opportunities for participation in the Program from the U. S. Educational Foundation or Commission (usually attached to the Embassy) in their own country. Applications are reviewed initially by each Foundation and those selected for consideration are forwarded to the Department of State which in turn sends them to the Committee on International Exchange of Persons of the Conference Board of Associated Research Councils, commonly referred to as the Conference Board Committee. This Committee reviews all applications and makes recommendations to the Board of Foreign Scholarships which is composed of leading educators appointed by the President of the United States. Final selection of recipients of awards is made by the Board.

If a university wishes to invite a foreign scholar known personally to the university and expects to pay him a salary or stipend for lecturing or research, the responsible administrative official of the university should send him an official letter of invitation, specifying the salary to be paid him and the dates during which he is expected to be at the university. If the appointment is contingent upon the receipt of the Fulbright award, this fact should be mentioned. The scholar attaches this letter to his application for an award, using it as evidence of dollar resources and of an institutional connection in the United States.

If a university wishes to invite a scholar for a particular remunerative lecture or research opening, but does not know anyone qualified for the position, the university may ask the Conference Board Committee to forward to the designated Foundation information regarding the opening and the qualifications required (forms for this purpose may be secured from the Committee). The Foundation would then be asked to announce the opening and forward the papers of applicants who, in the opinion of the Foundation, would also qualify for Fulbright assistance. Direct correspondence between the university and the individuals applying would then be expected. Once a definite offer is made, the procedure follows that outlined above.

The Conference Board Committee expects to have available in the near future a list of scholars wishing to lecture in American universities in the academic year 1952-53 who will be given favorable consideration for Fulbright awards if they receive an invitation to lecture. It is possible that a few of these scholars will be favorably considered for a Smith-Mundt grant-in-aid, thereby reducing the amount of the stipend

which the host university or college would be expected to offer. The Conference Board Committee will be glad to send the list of such scholars and brief biographic data to anyone interested. If a university wishes to invite a scholar on the list, it should write to the scholar directly in addition to notifying the Committee of its interest in him.

Further details regarding the procedures outlined above may be obtained from the Conference Board of Associated Research Councils, 2101 Constitution Avenue, Washington 25, D. C.

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

What is probably the largest number of applications to be received for any fellowship program, with the exception of the Fulbright, has been received by the National Academy of Sciences-National Research Council for the National Science Foundation. Approximately 2,700 applications for predoctoral fellowships and nearly 300 for the postdoctoral program have been received. These applications are now being evaluated and awards are expected to be made in the course of the spring.

INTERNATIONAL RELATIONS

INTERNATIONAL GEOLOGICAL CONGRESS

The Nineteenth International Geological Congress will meet in Algiers, September 8-15. Approximately 2,000 geologists have already indicated their intention to attend. The United States will be represented by an official delegation appointed by the Department of State.

The Congress program will be divided into fifteen sections covering a wide variety of geological fields of investigation including the pre-Cambrian geology of Africa, several phases of economic geology including petroleum in the Mediterranean region, the hydrology of arid and subarid regions, and the mechanics of rock deformation. Excursions placing particular emphasis on

the geological features of northern Africa and the western Sahara will precede and follow the Congress.

INTERNATIONAL ABSTRACTING SERVICE

At its annual meeting held in Washington, October 16-19, 1951, the Executive Board of the International Council of Scientific Unions decided to set up an International Abstracting Service with the aim of facilitating cooperation between existing abstracting journals. Several journals already have indicated their intention to participate. Full information concerning the new Service may be obtained from Professor G. A. Boutry, Conservatoire National des Arts et Métiers, 292 rue Saint-Martin, Paris, France.

SCIENTIFIC UNIONS

IMU

The first General Assembly of the International Mathematical Union will be held in Rome, Italy, March 6-8. The Union was formally established on September 10, 1951, when the tenth country applied for membership and was accepted by the Interim Committee. The United States adheres to the Union through the National Academy of Sciences-National Research Council and will be represented at the First General Assembly by a delegation designated by the Department of State.

The mathematicians attending the Assembly as delegates of adhering countries will vote on several items of a purely organizational nature. Their primary duties, however, will be to develop a scientific program for the Union, to determine what activities in the field of mathematics can be furthered most effectively through international cooperation, and to establish commissions to carry forward specific projects during interim periods between general assemblies.

IUBS

The Executive Committee of the International Union of Biological Sciences will meet in London on March 4 and 5. Upon invitation from the President and the Secretary of the Union, Paul Weiss, Chairman of the Division of Biology and Agriculture of the National Research Council, will attend. The agenda will include examination of the scientific programs sponsored by the Union and consideration of administrative and organizational matters.

IGU

The U.S.A. National Committee of the International Geographical Union, which is organizing the XVIIth International Geographical Congress to be held in Washington, August 8-15, met at the Academy-Council building on January 19 and 20. The two-day meeting was devoted to an examination of Congress plans developed over the past two years and to the preparation of a final program, including section and commission meetings, special symposia, excursions, and social events.

Eleven geographers from ten different countries were selected to receive Wallace W. Atwood Memorial Travel Grants and seventy-nine geographers from twenty-three countries were awarded National Committee Subsistence Grants. The Atwood Travel Grants and National Committee Subsistence Grants were established for the sole purpose of assisting foreign geographers to attend the International Geographical Congress. They are awarded by the National Committee and carry stipends of \$500 and \$200 each, respectively. Additional awards will be made some time in April.

IAU

Arrangements are taking shape for the Eighth General Assembly of the International Astronomical Union which will be held in Rome, Italy, September 4-13, 1952. Symposia are planned to include the following topics: Stellar Evolution, Astronomy of Faint Stars, and Instrumentation.

Some forty commissions of the Union will hold meetings at which reports covering a wide variety of astronomical topics will be presented. The chairmen of twenty of these commissions will be astronomers from the United States.

A Commission on Spectroscopy, sponsored jointly by the International Astronomical Union and the International Union of Pure and Applied Physics, will also meet in Rome during the above-mentioned period. The President of this joint Commission is W. F. Meggers, Chief of the Spectroscopy Section of the National Bureau of Standards. The following are also members of this Commission from the United States: George R. Harrison, Massachusetts Institute of Technology; Francis A. Jenkins, University of California; and Charlotte M. Sitterly, National Bureau of Standards.

URSI

Plans for United States participation in the Tenth General Assembly of the International Scientific Radio Union, which will be held in Sydney, Australia, August 11-21, are being developed by the U.S.A. National Committee of the Union. Those directly concerned with these plans are the officers

of the National Committee, the chairmen of the seven national commissions, and John H. Dellinger, a vice-president of URSI and former chairman of the National Committee.

The following appointments to the National Committee have been approved by the Chairman of the National Research Council: Major General R. C. Maude, U.S. Air Force; Captain W. B. Goulett, U.S. Navy; John R. Pierce, Bell Telephone Laboratories; and Chester H. Page, National Bureau of Standards.

Officers of the National Committee for the current period are: Charles R. Burrows, Cornell University, *Chairman*; Newbern Smith, National Bureau of Standards, *Vice-Chairman*; Arthur H. Waynick, Pennsylvania State College, *Secretary-Treasurer*; and Lloyd V. Berkner, Brookhaven National Laboratory, *Junior Past-Chairman*.

The seven national commissions which correspond in name to the seven commissions of the International Union are listed below:

Radio Standards and Methods of Measurement

Chairman, Francis J. Gaffney, Polytechnic Research and Development Co., Brooklyn.

Tropospheric Radio Propagation

Chairman, A. Waugh Straiton, University of Texas.

Ionospheric Radio Propagation

Chairman, Henry G. Booker, Cornell University.

Terrestrial Radio Noise

Chairman, Harold E. Dinger, Naval Research Laboratory.

Extra-terrestrial Radio Noise

Chairman, Alan H. Shapley, National Bureau of Standards.

Radio Waves and Circuits

Chairman, Samuel Silver, University of California at Berkeley.

Electronics

Chairman, Jack A. Morton, Bell Telephone Laboratories.

UICC

The International Union against Cancer and the International Cancer Research Commission, which is the scientific commission of the Union, met in Lisbon, Portugal, December 15-20, 1951. The United States was represented by Harold Stewart and Alexander Symeonidis of the National Cancer Institute; E. V. Cowdry, Washington University; and Isabelle Perry, University of California. Dr. Stewart is Executive

Secretary of the Committee on Geographical Pathology and Dr. Perry is Chairman of the Committee on Tumor Nomenclature, both committees of the International Cancer Research Commission. Twenty-four countries were represented at the meetings.

The International Union, with central offices in Paris, was formed in 1934 for the purpose of fostering world-wide cancer control, research, and education. The International Commission was established by the Union in 1947 and held its first meeting in Paris in 1949. It is concerned primarily with research and maintains a permanent headquarters at the National Cancer Institute, Bethesda, Md.

At the Lisbon meetings the Committee on Geographical Pathology of the International Commission broadly defined its field as comprising knowledge concerning variations in the distribution and behavior of cancer among various ethnological groups in different localities in relation to relevant local factors. The functions of the Committee may be summarized as follows: 1) to serve as a point of contact and communication between investigators in the field of geographical pathology in different parts of the world; 2) to invite the cooperation of cancer investigators to serve as correspondents, to promote the establishment of centers of information in various regions and countries of the world, and to encourage the formation of national and regional study sections and assist in the collection of scientific publications; 3) to encourage and facilitate cooperation on specific scientific problems by assisting in the procurement of grants-in-aid for research; 4) to call together at appropriate times small groups of experts to collect, compare, and evaluate their observations and to plan future investigations; 5) to promote the publication of all information on the endemology of cancer.

The next meeting of the Commission will be held in Bombay in December, 1952. The next International Congress on Cancer will be held in Sao Paulo in January, 1954. It was agreed that the Executive Committees of the Union and the Commission would meet in Sao Paulo on December 28, 1953, preceding the opening of the Congress on January 3.

RECORD OF MEETINGS

December

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| <p>1 Advisory Committee, Chemical-Biological Coordination Center
 Annual Meeting, Division of Chemistry and Chemical Technology
 Committee on Developmental Biology</p> <p>2 Governing Board of the Academy-Council</p> <p>3 Ad Hoc Committee on Procedures, Handbook of Biological Data
 Press Conference on Manual Methods of Artificial Respiration</p> <p>5 Committee on Associates, American Institute of Biological Sciences, <i>Princeton, N. J.</i>
 Subcommittee on Sterilization of Blood and Plasma</p> <p>6 Conference on Disaster Studies</p> <p>7 Annual Meeting, Pacific Science Board
 Committee on Pathology
 Subcommittee on Acceptance, <i>Chicago, Ill.</i></p> <p>7-8 Commission on Human Resources and Advanced Training
 Conference on Clinical Evaluation of Therapeutic Vitamin Mixtures</p> | <p>8 Conference on Photobiology</p> <p>8-9 Conference on Insect Physiology, <i>Cincinnati, Ohio</i></p> <p>10 Conference on Organization of the Agricultural Research Institute</p> <p>12 Toxicology Subcommittee</p> <p>12-13 Electrolytic Grinding Panel</p> <p>14 Ad Hoc Conference on Antibiotic Reserves
 Malignancy Subcommittee
 Manganese Panel
 Section of Fellowships, Committee on Growth</p> <p>15-16 Sections and Panels, Committee on Growth</p> <p>15, 17 Executive Committee, Committee on Growth</p> <p>18 Nickel Conservation Panel</p> <p>19 Ad Hoc Committee on Naval Guns</p> <p>20 Committee on Applied Research Manual</p> <p>21 Conference Board Committee on International Exchange of Persons</p> <p>28 Subcommittee on Malaria</p> |
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NEW PUBLICATIONS

Glossary of Terms in Nuclear Science and Technology. Section IV, *Chemistry*. 29, xx p. \$0.60. New York, American Society of Mechanical Engineers, 1951.

Origin-Destination Surveys and Traffic Volume Studies. Compiled by Robert Emmanuel Barkley. Highway Research Board Bibliography No. 11. National Research Council, 1951. 277 p. \$3.

Soil Compaction. Highway Research Board Bulletin No. 42. National Research Council, 1951. 23 p. \$0.45.

Studies in Night Visibility. Highway Research Board Bulletin No. 43. National Research Council, 1951. 56 p. \$0.90.

Use of Chemical Additives in Foods. National Research Council, 1951. 24 p.

Volcanic Ash and Laterite Soils in Highway Construction. Highway Research Board Bulletin No. 44. National Research Council, 1951. 32 p. \$0.60.

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